

APR-18-07 13:58

FROM-borgwarner emissions/thermal systems

269 565 8200

T-193 P.002/008 F-378

RECEIVED  
CENTRAL FAX CENTER

MAY 07 2007

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

## IN RE REISSUE APPLICATION OF:

PATENTEE: DALE M. PICKELMAN; JOHN GARDNER FISCHER  
TITLE: V-BLADE IMPELLER DESIGN FOR A REGENERATIVE TURBINE  
PATENT NO: 6,439,833  
ISSUE DATE: AUGUST 27, 2002

## REISSUE DECLARATION

Mail Stop Reissue  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Dale M. Pickelman and John Gardner Fischer hereby declare and say that:

I. Our residence, post office address and citizenship are as follows:

Dale M. Pickelman

Residence: Marshall, Michigan  
Post Office Address: 17451 G. Drive North  
Marshall, MI 49068  
Citizenship: United States of America

John Gardner Fischer

Residence: Goodrich, Michigan  
Post Office Address: 6240 Washburn Road  
Goodrich, MI 48438  
Citizenship: United States of America

APR-18-07

13:58

FROM-borgwarner emissions/thermal systems

268 665 8200

T-193

P.003/008

F-379

2. We believe we are the original, first, and sole inventors of the subject matter which is claimed and for which a reissue patent is sought on the invention entitled: V-BLADE IMPELLER DESIGN FOR A REGENERATIVE TURBINE, the specification of which is attached hereto.

3. We hereby state that we have reviewed and understand the contents of the above-identified specification, including the claims.

4. We acknowledge the duty to disclose information, which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, 1.56.

5. We believe that our U.S. Patent No. 6,439,833 ('833) partly inoperative or invalid by reason of a defective specification or drawing. In addition, we believe that the original patent to be is wholly or partly inoperative or invalid by reason of our claiming less than we had a right to claim in the patent. For example, at least claim 1 contained an error because we were entitled to claim 32. We were entitled to a claim without the following limitations: "into which a shaft of said turbine pump is securable", "an outer ring concentric to said hub", "that extends from a radially outward terminus", and "said entrance and said exit portions of each said vane each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

6. The following is a further discussion of at least one error being relied upon as the basis for the reissue, and hence the changes to the application:

A. In the specification at column 9, line 29, the range of 50 to 30 degrees is incorrect. In the original filed specification, the range was listed as 5 to 30 degrees.

APR-18-07 13:58 FROM-borgwarner emissions/thermal systems 269 565 0200 T-103 P.004/008 F-379

B. New independent claims 32 and 43 have been added.

Claim 32 with respect to claim 1 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". The ring is not recited as "an outer ring concentric to said hub". The vanes while having an exit portion do not recite an exit portion "that extends from a radially outward terminus". The vanes while having a V-shape are not recited as having "a V-shape of a prespecified angle centered"; rather "a V-shape of a first angle" is recited. The vanes are not recited as having a "said entrance portion and said exit portion aligned in a non-linear disposition with respect to one another along a dimension of each of said vanes extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring along at least one of an upstream face and downstream face of said vane from said entrance portion thereof through said exit portion thereof". The vanes are stated in this new claim as having "at least one of said entrance portion and said exit portion being disposed at a second angle relative to a second plane passing through said center axis and normal to a direction of rotation of said impeller". Further, this new claim does not recite "said entrance and said exit portions of each said vane each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

Claim 32 with respect to claim 11 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". The ring is not recited as "an outer ring concentric to said hub". The vanes while having an entrance portion do not recite an entrance portion "that extends linearly outward from said outer cylindrical surface of said hub". Also, the while having an exit portion do not recite an exit portion "that extends linearly from a radially outward terminus of said entrance portion". The vanes while having a V-shape are not recited as having "a V-shape of a prespecified angle centered"; rather "a V-shape of a first angle" is recited. The vanes while having an exit portion do not recite the exit portion "of each of said vanes being inclined forward of said entrance portion of each of said vanes so as to advance toward said inner cylindrical surface of said outer ring at an exit angle with respect to a direction of rotation of said impeller". The vanes are stated in this new claim as having "at least one of said entrance portion and said exit portion being

APR-18-07 13:58 FROM:borgwarner emissions/thermal systems 260 566 8200 T-103 P.005/008 F-370

disposed at a second angle relative to a second plane passing through said center axis and normal to a direction of rotation of said impeller". Further, this new claim does not recite "said entrance and said exit portions each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

Claim 32 with respect to claim 21 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". The ring is not recited as "an outer ring concentric to said hub". The vanes while having an exit portion do not recite an exit portion "that extends from a radially outward terminus". The vanes while having a V-shape are not recited as having "a V-shape of a prespecified angle centered ... and being curved"; rather "a V-shape of a first angle" is recited. The vanes while having an entrance portion do not recite the entrance portion "drawing away from said outer cylindrical surface of said hub at an entrance angle with respect to a direction of rotation of said impeller. Also, the vanes while having an exit portion do not recite the exit portion "advancing toward said inner cylindrical surface of said outer ring at an exit angle with respect to said direction of rotation". The vanes are stated in this new claim as having "at least one of said entrance portion and said exit portion being disposed at a second angle relative to a second plane passing through said center axis and normal to a direction of rotation of said impeller". Further, this new claim does not recite "said entrance and said exit portions each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

Claim 42 with respect to claim 1 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". This new claim does not recite, "an outer ring concentric to said hub, said outer ring having an inner cylindrical surface". The vanes are not recited as "extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring". The vanes while having an exit portion do not recite the exit portion "that extends from a radially outward terminus of said entrance portion to said inner cylindrical surface of said outer ring". The vanes while having a V-shape are not recited as having "a V-shape of a prespecified angle centered ... and being curved"; rather "a V-shape of a first angle" is recited. The entrance portion and exit

APR-10-07 13:58

FROM:borqwarner emissions/thermal systems

260 565 8200

T-193 P.006/008 F-379

portion are not stated to be "aligned in a non-linear disposition with respect to one another along a dimension of each of said vanes extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring along at least one of an upstream face and downstream face of said vane from said entrance portion thereof through said exit portion thereof". The vanes are stated in this new claim as having "an entrance portion that extends from said outer cylindrical surface of said hub and an exit portion that extends outwardly from said entrance portion to a distal end of said vane". Further, the entrance portion and exit portion are recited in this new claim as being "chamfered along a trailing segment thereof", rather than "each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

Claim 42 with respect to claim 11 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". This new claim does not recite, "an outer ring concentric to said hub, said outer ring having an inner cylindrical surface". The vanes are not recited as "extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring". The vanes while having an entrance portion do not recite an entrance portion "that extends linearly outward from said outer cylindrical surface of said hub". Also, the while having an exit portion do not recite an exit portion "that extends linearly from a radially outward terminus of said entrance portion to said inner cylindrical surface of said outer ring". The vanes while having a V-shape are not recited as having "a V- shape of a prespecified angle centered ... and being curved"; rather "a V-shape of a first angle" is recited. The exit portion is not stated to be "inclined forward of said entrance portion of each of said vanes so as to advance toward said inner cylindrical surface of said outer ring at an exit angle with respect to a direction of rotation of said impeller". The vanes are stated in this new claim as having "an entrance portion that extends from said outer cylindrical surface of said hub and an exit portion that extends outwardly from said entrance portion to a distal end of said vane". Further, the entrance portion and exit portion are recited in this new claim as being "chamfered along a trailing segment thereof", rather than "each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

APR-10-07 13:58

FROM-borgwarner emissions/thermal systems

260 565 0200

T-103 P.007/008 F-370

Claim 42 with respect to claim 21 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". This new claim does not recite, "an outer ring concentric to said hub, said outer ring having an inner cylindrical surface". The vanes are not recited as "extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring". The vanes are not recited as "extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring". The vanes while having an exit portion do not recite the exit portion "that extends from a radially outward terminus of said entrance portion to said inner cylindrical surface of said outer ring". The vanes while having a V-shape are not recited as having "a V-shape of a prespecified angle centered ... and being curved"; rather "a V-shape of a first angle" is recited. The vanes while having an entrance portion do not recite the entrance portion "drawing away from said outer cylindrical surface of said hub at an entrance angle with respect to a direction of rotation of said impeller. Also, the vanes while having an exit portion do not recite the exit portion "advancing toward said inner cylindrical surface of said outer ring at an exit angle with respect to said direction of rotation". The vanes are stated in this new claim as having "at least one of said entrance portion and said exit portion being disposed at a second angle relative to a second plane passing through said center axis and normal to a direction of rotation of said impeller". Further, this new claim does not recite "said entrance and said exit portions each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

C. New dependent claims 33 - 42 depend from new independent claim 32, and further limit this independent claim. New dependent claims 44 - 55 depend from new independent claim 43, and further limit this independent claim.

7. The errors in claiming less than we had a right to claim, described and specified above, and particularly in paragraph 5, arose without any deceptive intent on our part. The errors became known as the result of a recent review of the '833 patent in the course of reviewing a published Japanese application. In reviewing the '833 patent, we noted the inclusion of claim limitations that were not necessary for the invention had been included in the claims. It then became apparent that the true scope of our invention, as set forth in the new claims submitted

APR-18-07 13:58 FROM-borgwarner emissions/thermal systems

269 555 8200


T-193 P.008/008 F-378

RECEIVED  
CENTRAL FAX CENTER

MAY 07 2007

herewith, including but not limited to claims 32 and 43, was not appreciated by us or our attorney until our review of the published Japanese application.

8. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 001 of Title 18 of United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

Date: 4/18/07  
Dale M. Pickelman

Date: \_\_\_\_\_

\_\_\_\_\_  
John Gardner Fischer

8104944457

2e mailroom

14:37:47

04-23-2007

2/8

RECEIVED  
CENTRAL FAX CENTER

MAY 07 2007

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

## IN RE REISSUE APPLICATION OF:

PATENTEE: DALE M. PICKELMAN; JOHN GARDNER FISCHER  
TITLE V-BLADE IMPELLER DESIGN FOR A REGENERATIVE TURBINE  
PATENT NO: 6,439,833  
ISSUE DATE: AUGUST 27, 2002

## REISSUE DECLARATION

Mail Stop Reissue  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Dale M. Pickelman and John Gardner Fischer hereby declare and say that:

1. Our residence, post office address and citizenship are as follows:

Dale M. Pickelman

Residence: Marshall, Michigan  
Post Office Address: 17451 G. Drive North  
Marshall, MI 49068  
Citizenship: United States of America

John Gardner Fischer

Residence: Goodrich, Michigan  
Post Office Address: 6240 Washburn Road  
Goodrich, MI 48438  
Citizenship: United States of America



8104944457

2e mailroom

14:37:55

04-23-2007

3/8

2. We believe we are the original, first, and sole inventors of the subject matter which is claimed and for which a reissue patent is sought on the invention entitled: V-BLADE IMPELLER DESIGN FOR A REGENERATIVE TURBINE, the specification of which is attached hereto.

3. We hereby state that we have reviewed and understand the contents of the above-identified specification, including the claims.

4. We acknowledge the duty to disclose information, which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, 1.56.

5. We believe that our U.S. Patent No. 6,439,833 ('833) partly inoperative or invalid by reason of a defective specification or drawing. In addition, we believe that the original patent to be is wholly or partly inoperative or invalid by reason of our claiming less than we had a right to claim in the patent. For example, at least claim 1 contained an error because we were entitled to claim 32. We were entitled to a claim without the following limitations: "into which a shaft of said turbine pump is securable", "an outer ring concentric to said hub", "that extends from a radially outward terminus", and "said entrance and said exit portions of each said vane each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

6. The following is a further discussion of at least one error being relied upon as the basis for the reissue, and hence the changes to the application:

A. In the specification at column 9, line 29, the range of 50 to 30 degrees is incorrect. In the original filed specification, the range was listed as 5 to 30 degrees.

8104944457

2e mailroom

14:38:08

04-23-2007

4 / 8

B. New independent claims 32 and 43 have been added.

Claim 32 with respect to claim 1 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". The ring is not recited as "an outer ring concentric to said hub". The vanes while having an exit portion do not recite an exit portion "that extends from a radially outward terminus". The vanes while having a V-shape are not recited as having "a V-shape of a prespecified angle centered"; rather "a V-shape of a first angle" is recited. The vanes are not recited as having a "said entrance portion and said exit portion aligned in a non-linear disposition with respect to one another along a dimension of each of said vanes extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring along at least one of an upstream face and downstream face of said vane from said entrance portion thereof through said exit portion thereof". The vanes are stated in this new claim as having "at least one of said entrance portion and said exit portion being disposed at a second angle relative to a second plane passing through said center axis and normal to a direction of rotation of said impeller". Further, this new claim does not recite "said entrance and said exit portions of each said vane each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

---

~~Claim 32 with respect to claim 11 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". The ring is not recited as "an outer ring concentric to said hub". The vanes while having an entrance portion do not recite an entrance portion "that extends linearly outward from said outer cylindrical surface of said hub". Also, the while having an exit portion do not recite an exit portion "that extends linearly from a radially outward terminus of said entrance portion". The vanes while having a V-shape are not recited as having "a V-shape of a prespecified angle centered"; rather "a V-shape of a first angle" is recited. The vanes while having an exit portion do not recite the exit portion "of each of said vanes being inclined forward of said entrance portion of each of said vanes so as to advance toward said inner cylindrical surface of said outer ring at an exit angle with respect to a direction of rotation of said impeller". The vanes are stated in this new claim as having "at least one of said entrance portion and said exit portion being~~

8104944457

2e mailroom

14:38:27

04-23-2007

5/8

disposed at a second angle relative to a second plane passing through said center axis and normal to a direction of rotation of said impeller". Further, this new claim does not recite "said entrance and said exit portions each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

Claim 32 with respect to claim 21 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". The ring is not recited as "an outer ring concentric to said hub". The vanes while having an exit portion do not recite an exit portion "that extends from a radially outward terminus". The vanes while having a V-shape are not recited as having "a V-shape of a prespecified angle centered ... and being curved"; rather "a V-shape of a first angle" is recited. The vanes while having an entrance portion do not recite the entrance portion "drawing away from said outer cylindrical surface of said hub at an entrance angle with respect to a direction of rotation of said impeller. Also, the vanes while having an exit portion do not recite the exit portion "advancing toward said inner cylindrical surface of said outer ring at an exit angle with respect to said direction of rotation". The vanes are stated in this new claim as having "at least one of said entrance portion and said exit portion being disposed at a second angle relative to a second plane passing through said center axis and normal to a direction of rotation of said impeller". Further, this new claim does not recite "said entrance and said exit portions each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

Claim 42 with respect to claim 1 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". This new claim does not recite, "an outer ring concentric to said hub, said outer ring having an inner cylindrical surface". The vanes are not recited as "extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring". The vanes while having an exit portion do not recite the exit portion "that extends from a radially outward terminus of said entrance portion to said inner cylindrical surface of said outer ring". The vanes while having a V-shape are not recited as having "a V-shape of a prespecified angle centered ... and being curved"; rather "a V-shape of a first angle" is recited. The entrance portion and exit

8104944457

2e mailroom

14:38:45 04-23-2007

6/8

portion are not stated to be "aligned in a non-linear disposition with respect to one another along a dimension of each of said vanes extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring along at least one of an upstream face and downstream face of said vane from said entrance portion thereof through said exit portion thereof". The vanes are stated in this new claim as having "an entrance portion that extends from said outer cylindrical surface of said hub and an exit portion that extends outwardly from said entrance portion to a distal end of said vane". Further, the entrance portion and exit portion are recited in this new claim as being "chamfered along a trailing segment thereof", rather than "each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

Claim 42 with respect to claim 11 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". This new claim does not recite, "an outer ring concentric to said hub, said outer ring having an inner cylindrical surface". The vanes are not recited as "extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring". The vanes while having an entrance portion do not recite an entrance portion "that extends linearly outward from said outer cylindrical surface of said hub". Also, the while having an exit portion do not recite an exit portion "that extends linearly from a radially outward terminus of said entrance portion to said inner cylindrical surface of said outer ring". The vanes while having a V-shape are not recited as having "a V- shape of a prespecified angle centered ... and being curved"; rather "a V-shape of a first angle" is recited. The exit portion is not stated to be "inclined forward of said entrance portion of each of said vanes so as to advance toward said inner cylindrical surface of said outer ring at an exit angle with respect to a direction of rotation of said impeller". The vanes are stated in this new claim as having "an entrance portion that extends from said outer cylindrical surface of said hub and an exit portion that extends outwardly from said entrance portion to a distal end of said vane". Further, the entrance portion and exit portion are recited in this new claim as being "chamfered along a trailing segment thereof", rather than "each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

0104944457

2e mailroom

14:39:04

04-23-2007

7 / 8

Claim 42 with respect to claim 21 differs in the following ways. The hub while having an aperture at a center thereof does not recite, "into which a shaft of said turbine pump is securable". This new claim does not recite, "an outer ring concentric to said hub, said outer ring having an inner cylindrical surface". The vanes are not recited as "extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring". The vanes are not recited as "extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring". The vanes while having an exit portion do not recite the exit portion "that extends from a radially outward terminus of said entrance portion to said inner cylindrical surface of said outer ring". The vanes while having a V-shape are not recited as having "a V-shape of a prespecified angle centered ... and being curved"; rather "a V-shape of a first angle" is recited. The vanes while having an entrance portion do not recite the entrance portion "drawing away from said outer cylindrical surface of said hub at an entrance angle with respect to a direction of rotation of said impeller. Also, the vanes while having an exit portion do not recite the exit portion "advancing toward said inner cylindrical surface of said outer ring at an exit angle with respect to said direction of rotation". The vanes are stated in this new claim as having "at least one of said entrance portion and said exit portion being disposed at a second angle relative to a second plane passing through said center axis and normal to a direction of rotation of said impeller". Further, this new claim does not recite "said entrance and said exit portions each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane".

C. New dependent claims 33 - 42 depend from new independent claim 32, and further limit this independent claim. New dependent claims 44 - 55 depend from new independent claim 43, and further limit this independent claim.

7. The errors in claiming less than we had a right to claim, described and specified above, and particularly in paragraph 5, arose without any deceptive intent on our part. The errors became known as the result of a recent review of the '833 patent in the course of reviewing a published Japanese application. In reviewing the '833 patent, we noted the inclusion of claim limitations that were not necessary for the invention had been included in the claims. It then became apparent that the true scope of our invention, as set forth in the new claims submitted

8104944457

2e mailroom

14:39:23

04-23-2007

8 / 8

RECEIVED  
CENTRAL FAX CENTER

MAY 07 2007

herewith, including but not limited to claims 32 and 43, was not appreciated by us or our attorney until our review of the published Japanese application.

8. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 001 of Title 18 of United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

Date: \_\_\_\_\_

\_\_\_\_\_  
Dale M. PickelmanDate: 23AP07  
John Gardner Fischer